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MEMBER AFCCE

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November 8, 1999

Magalie Roman Salas
Office of the Secretary
TW-A306
Federal Communications Commission
445 12th Street, S. W.
Washington, D. C. 20554

re: MM Docket 93-177

Dear Ms. Salas:

Enclosed please find an original and four copies of the comments of Sellmeyer Engineering in the matter of Mass Media Docket 93-177, An Inquiry Into the Commission's Policies and Rules Regarding AM Radio Service Directional Antenna Performance Verification.

Sincerely,

J. S. Sellmeyer, P. E.

Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
An Inquiry Into the Commission's	)	
Policies and Rules Regarding AM	)	MM Docket No. 93-177
Radio Service Directional Antenna	)	
Performance Verification	)	

COMMENTS OF SELLMEYER ENGINEERING
ON NOTICE OF PROPOSED RULEMAKING

Introduction

Sellmeyer Engineering is a Professional Engineering Firm engaged in the practice of consulting engineering before the Federal Communications Commission.

We support and commend the Commission for its efforts to review and, where possible, simplify or eliminate the regulatory and compliance burdens on AM broadcasters using directional antennas.

Computer Modeling versus Proofs of Performance

Directional antenna systems have been used since the 1930's in AM broadcasting to permit stations to coexist on the same or adjacent channels with a minimum of objectionable interference. The Full Proof of Performance has historically been the tool used to verify the performance of these antenna systems prior to issuance of an operating license for the particular facility.

This Firm has limited experience using moment method modelling to adjust AM directional arrays. In most cases, an array adjusted on the basis of moment method modelling has fallen within the standard pattern envelope upon completion of adjustment of the phasing and coupling system to predicted values. In some cases minor adjustment of the array has been required to achieve proper adjustment. We believe that moment method modelling is appropriate for initial adjustment of some arrays but we believe it is premature to accept or reject it as an accepted method for determination of proper adjustment of directional antenna systems. We believe the matter of computer modelling should be made the subject of a Further Notice of Proposed Rulemaking. The other matters in the instant Rulemaking could then be considered and the Rulemaking brought to a prompt conclusion.

Directional Antenna Proofs of Performance

The Commission currently requires a minimum of eight radials, each with a minimum of 30 points between zero and 33 kilometers for a full proof. A partial proof currently requires at least 10 points between three and 16 kilometers for each radial used in the last full proof. The Commission

proposes to reduce the requirements for a full proof to a minimum of six radials, each with a minimum of 15 points between zero and 15 kilometers. The Commission proposes to reduce the requirements for a partial proof to a minimum of eight points per radial with no other changes in the partial proof.

Full Proof of Performance

The purpose of a full proof of performance is to establish the fundamental base line for showing antenna performance and compliance. A full proof is required when the antenna is first constructed and when any permanent changes are made in the location, height, or directional radiating characteristics of the antenna. A full proof of performance is rarely done after initial licensing of the facility.

We support the proposed reduction in the requirements for the Full Proof of Performance and suggest further that the measured radials be limited to those necessary to establish compliance with the protection requirements of the construction permit. These should be limited to the bearings of the pattern minima and maxima at levels at or below the pattern RMS, and to any higher level radials for which a monitor point is specified. We believe that the normal three radials required to establish the efficiency in the major lobes need not be measured since they are usually not germane to the interference protection requirements for other stations. Elimination of these requirements would be consistent with the direction of the Commission's efforts to rely on the marketplace for compliance with non-interference aspects of the Rules and Policies.

We concur with the Commission's proposal to reduce the number of required measurement points per radial to 15 spread over a fifteen kilometer length. We also concur with the proposed minimum distance and spacing requirements.

With reference to the measured data described in paragraph 18, we suggest that the location of each measured point be defined either by a map location as is presently done or by means of measured coordinates specified to an appropriate level of accuracy. It is well known by most practitioners that measured field intensities can vary significantly over a few feet from a particular measurement point, particularly when measuring a very low level field in a densely populated urban environment. Thus, the exact point needs to be adequately defined to permit accurate location for future Partial Proofs. We would suggest an accuracy of a diameter on the order of ten feet. This is presently achievable with differential GPS receivers. We believe the logging of the time of each measurement serves no useful purpose and should be discontinued.

With regard to non-directional stations which are required to conduct a full proof due to the proximity of reradiating structures, etc., the Commission proposes reducing the number of evenly spaced radials from eight to

six, the same as the minimum number of radials proposed for any other full proof. In those cases where measurements are required for a nondirectional antenna because of the impending construction of a new tower nearby and a previous full proof does not exist, a full proof should also be required, provided the full proof requirements are simplified as proposed. The technical requirements are the same whether a previous full proof exists or not.

Partial Proof of Performance

A partial proof of performance is required when any one of many things occur. Among these events are construction of a tower or other potential re-radiating device in the vicinity of the array, a monitor point exceeding its limit, antenna monitor readings exceeding specified tolerances, modifications of a tower above the base insulator such as replacement or addition of transmission lines and antennae mounted on the tower, addition or replacement of guy wires or if the station has been off the air for more than six months.

The Partial Proof of Performance is a diagnostic tool for determining compliance with the terms of the Station License after the initial license is issued. This may be done many times during the life of a directive array. With the proliferation of cellular telephone towers over the past few years, many directional stations have had one or more partial proofs of performance performed. It is likely that the major cost savings will come from the reduction of the measurement requirements for partial proofs of performance. We support the proposed reduction in the number of measurements required for a partial proof of performance. We suggest that a minimum of eight of the originally measured points be required along each radial including any specified monitor point.

We also suggest the Commission make clear its authority to require a full proof of performance at any time it deems necessary to settle a dispute when a partial proof does not appear to agree with interference measurements.

We also suggest the Commission substantially increase the fine for willful operation not in compliance with the terms of the station license.

Monitoring Points

Monitoring points are selected from points originally measured as part of a full proof of performance. These points are generally chosen to fall on or close to the conductivity curve for that portion of the radial so as to be representative of the radial as a whole. When a point is no longer accessible or changes in the local environment make it no longer usable the Commission proposes to allow selection of an alternate point measured in the original full proof of performance. We concur with this proposal provided the environment of the selected point has not, itself, been subject to significant changes. If a suitable point cannot be located, we suggest non-directional and directional measurements be run on the radial and analyzed according to

present practice. A new monitoring point should be selected from this data which need not be limited to originally measured points provided the inverse distance field is within the limits imposed by the standard or modified standard pattern for the station.

We believe the monitor points should be described in a manner such that anyone skilled in the art can locate the point. This should be done either by a map location together with the appropriate description or (optionally) by specification of geographic coordinates accurate to an appropriate radius. We suggest a radius of ten feet. We further believe that the method should not be limited to differential GPS systems, but that the required accuracy be specified. In either case a complete description of the monitor point location should be included.

Base Current Ammeters

We concur with the Commission proposal to eliminate the requirement for measurement of antenna base currents. The technology of modern antenna monitors when connected to an approved sampling system has eliminated the need for base current readings. Thermocouple type ammeters are subject to many errors caused by temperature variations, physical assault by lightning and original calibration errors by practitioners of the "black art" of calibrating these devices. Maintenance of base current ratios in a complex array is simply not practical in this day. The use of modern toroidal coupled ammeters is not practical due to the cost and scale graduations of most currently available meters. These typically do not allow reading to the degree of accuracy stated on most licenses (three digits).

Antenna Monitors

We are puzzled by the Commission proposal to delete substantially all of the antenna monitor construction and operational requirements contained in Section 73.53 of the Rules. We believe these continue to be appropriate to the production of monitors suitable for use in the industry. We see no reason to eliminate them and request that they be retained.

We believe a discussion of the use of voltage sampling devices in lieu of current sampling devices is warranted. It is our opinion that use of such devices should be authorized for towers with electrical heights between approximately 100 and 200 degrees. We further suggest that a method be developed to measure and specify the accuracy of such sampling devices. We suggest this subject be included in a Further Notice of Rulemaking, perhaps also including a discussion of computer modelling techniques.

Common Point Impedance Measurements

We concur with the Commission's proposal to eliminate the requirement for Directional Antenna Common Point Impedance measurements over a range of frequencies. We suggest that a sweep of frequencies be permitted in cases where excessive interference is present on the channel being measured.

We also note the proposal to remove the requirement that the reactance be adjusted to zero ohms at the point of power measurement. We believe this is appropriate. With the advent of modern solid state transmitters, it is necessary to present a non-reactive symmetrical load at the output of most of these transmitters for best audio performance. Frequently, the common point measurement location is some distance away from the coaxial cable termination at the directional antenna phasing equipment. Setting the reactance to zero ohms at the meter location often results in a reactive load at the transmitter output termination. This, in turn, often results in less than optimum audio performance from the transmitter.

Antenna Monitors for Critical Arrays

We concur with the proposal to eliminate specially designed antenna monitors for critical arrays. Our experience with modern monitors such as the Potomac Instruments AM-1900 series indicates that the accuracy, stability and reliability of these instruments is superior to the precision monitors presently required.

Critical Array Designation & Methodology

We concur with the proposal to limit the application of critical array designations to nighttime and critical hours arrays. We believe that analysis of an array should be limited to the bearings and vertical angles which are germane to an actual protection arc toward an operating or proposed station.

Respectfully submitted:

Sellmeyer Engineering
J. S. Sellmeyer, P. E.